

On November 4, 2008, Michigan voters will decide whether to amend the State Constitution to address research using stem cells from human embryos. The result of a petition drive, Proposal 08-2 will appear on the ballot as follows:

### **PROPOSAL 08-2**

#### **A PROPOSAL TO AMEND THE STATE CONSTITUTION TO ADDRESS HUMAN EMBRYO AND HUMAN EMBRYONIC STEM CELL RESEARCH IN MICHIGAN**

*The proposed constitutional amendment would:*

- *Expand use of human embryos for any research permitted under federal law subject to the following limits: the embryos --*
  - are created for fertility treatment purposes;*
  - are not suitable for implantation or are in excess of clinical needs;*
  - would be discarded unless used for research;*
  - were donated by the person seeking fertility treatment.*
- *Provide that stem cells cannot be taken from human embryos more than 14 days after cell division begins.*
- *Prohibit any person from selling or purchasing human embryos for stem cell research.*
- *Prohibit state and local laws that prevent, restrict or discourage stem cell research, future therapies and cures.*

*Should this proposal be adopted?*

If a majority of the electors vote "yes", Proposal 08-2 will add Article I, Section 27 to the State Constitution.

#### **Background**

Stem cells are unspecialized cells characterized by their ability to renew themselves for long periods of time through cell division, and their capacity to differentiate into specialized cell types, such as blood, muscle, and nerve cells.

There are two kinds of stem cells: embryonic and adult. Embryonic stem cells are derived from embryos created through in vitro fertilization (IVF), an increasingly common treatment for infertility. (Typically, excess embryos not implanted are discarded.) The stem cells generally are harvested when the embryo is four to five days old, at which time it is a ball of cells called a blastocyst. The cells are placed in laboratory culture dishes, where they proliferate, yielding millions of stem cells that make up an embryonic stem cell line.

Under certain conditions, the stem cells begin to differentiate. Scientists are working to understand how the differentiation can be directed, in order to generate cultures of specific cell types so that, in the future, they can use the resulting cells to treat various conditions and diseases, such as Parkinson's disease, diabetes, spinal cord injury, muscular dystrophy, heart disease, strokes, burns, and vision and hearing loss.

Adult stem cells are undifferentiated cells found among differentiated cells in a tissue or organ. Unlike embryonic stem cells, adult stem cells generally differentiate, when activated, to yield the specialized cell types of the tissues and organs where they reside. Their primary function is to maintain and repair tissue. They are thought to remain in a specific area of a tissue without dividing, until activated by disease or injury. It is believed that adult stem cells can be found among tissues including the brain, bone marrow, peripheral blood, blood vessels, skeletal muscle, skin, and liver.

Embryonic stem cells are pluripotent, meaning they can become all cell types. Adult stem cells are generally multipotent, meaning they are limited to differentiating into cell types of their tissue of origin. There is some evidence, however, that adult stem cells have some capacity to differentiate into other cell types, under certain conditions.

#### **Federal Law**

Currently, Federal law does not prohibit embryonic stem cell research, but Federal

funding for such research is restricted. According to an announcement made by President Bush in 2001, Federal funds may be used for research on embryonic stem cell lines under the following conditions:

- The derivation process (beginning with the destruction of the embryo) was initiated before August 9, 2001.
- The stem cells were derived from an embryo that was created for reproductive purposes and was no longer needed.
- Informed consent was obtained for the embryo's donation, which did not involve financial inducements.

Of the stem cell lines existing at that time, 21 exist today and are viable for research and eligible for Federal funding. Federal funds may not be used for the derivation or use of lines derived from newly destroyed embryos, the creation of human embryos for research purposes, or the cloning of human embryos for any purpose.

#### **State Law**

Michigan's Public Health Code prohibits the use of a live human embryo for nontherapeutic research (i.e., scientific or laboratory research, or other kind of experimentation or investigation not designed to improve the health of the research subject) if the research substantially jeopardizes the embryo's life or health. A violation is a felony punishable by imprisonment for up to five years.

This prohibition makes it illegal for researchers in Michigan to create new stem cell lines, but they may conduct embryonic stem cell research using the original stem cell lines (qualifying for Federal funding). They also may study lines created in other states that do not have the same restrictions as Michigan; in this case, the research must be conducted with private funds.

#### **Discussion**

Proponents of embryonic stem cell research cite its potential to treat diseases, test pharmaceuticals, and increase understanding of

human growth and development. Reportedly, more than 100 million Americans suffer from diseases that could be treated effectively or cured with future cell-based therapies. If Proposal 08-2 is approved, the stem cells may be derived only from excess embryos created through IVF that otherwise would be discarded as medical waste. Additionally, the proposal prohibits financial incentives for embryo creation.

Some people oppose embryonic stem cell research, however, because it results in the destruction of the blastocyst, which some consider the termination of human life. They suggest that more attention should be given to the potential of alternatives. Adult stem cells, for example, already have been used in bone marrow transplants for approximately 30 years. Furthermore, under certain circumstances, scientists have been able to induce pluripotency in adult stem cells. Opponents also point to promising research involving stem cells derived from umbilical cord blood and "artificial" stem cells made by inserting certain genes into skin cells. These options would avoid the moral questions raised in developing cell-based therapies.

According to those who support embryonic stem cell research, while alternative sources have potential, embryonic cells presently are the best option for several reasons. For example, large numbers of stem cells are necessary for the research. Embryonic cells can be grown in a laboratory relatively easily, while adult stem cells exist in small numbers within tissues, and methods for cultivating them are less advanced. Also, while adult stem cells have been induced to become pluripotent in some cases, generally their differentiation capacity is limited to the tissue type of origin. Researchers are concerned about the effectiveness and potential consequences of alternative technologies, and claim that more embryonic research is necessary to compare all of the possibilities. Supporters also note that the existing lines are limited and, in some cases, compromised, thus necessitating the creation of additional lines.

Proponents point out that Michigan's embryonic research laws are among the most restrictive in the nation, and may contribute to an environment that is inhospitable to the life sciences sector and encourages scientists, as well as associated biotechnology and pharmaceutical companies, to locate in other states. According to supporters, Proposal 08-2 could stimulate economic development and lead to potentially thousands of new jobs. Those averse to the proposal, however, believe that the ethical concerns trump the potential economic benefit. They also are concerned that the State could use tax dollars to fund stem cell research.

In addition, opponents of Proposal 08-2 have expressed concern that it does not prohibit cloning and, if approved, will allow the use of human embryos for "any research purpose permitted under federal law". Somatic cell nuclear transfer, the technique at the center of cloning research, could have applications in stem cell research. Potentially, stem cells could be taken from embryos cloned to have the same genetic makeup as a patient, thus eliminating the chance of rejection by the patient's immune system. At this time, human cloning is not prohibited at the Federal level, although an Executive Order issued in 1997 by President Bill Clinton prohibits Federal funding for human cloning. Michigan's Human Cloning Funding Prohibition Act also prohibits the use of State funds for this purpose. The State's Public Health Code does prohibit human cloning and prescribes administrative penalties and a \$10.0 million civil fine for a violation. Some are concerned, however, that the Code could be amended and, absent a constitutional ban, that Proposal 08-2 could result in the use of embryos for cloning purposes. Proponents of the proposal point out that, if approved, it will not change the existing ban.



## Senate Fiscal Agency

### NOVEMBER 2008 BALLOT PROPOSAL 08-2

An Overview

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